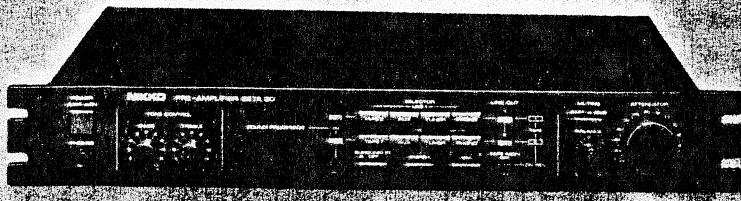


BETA 30/30s BETA 50/50s

STEREO PREAMPLIFIER



BETA 30



BETA 50

TYPE AND VOLTAGE

W-TYPE :	UL and CSA type	120V AC
E-TYPE :	NK-STD type	220V AC
V-TYPE :	Multi-Voltage type	110/120/220/240V AC

SERVICE MANUAL

CONTENTS

SPECIFICATIONS	1, 2
BLOCK DIAGRAM	3, 4
DISASSEMBLY	5
PARTS LOCATION	6
SCHEMATIC DIAGRAM	8, 9, 12, 13
P. C. BOARD	10, 11, 14, 15
PARTS LIST	7, 16 ~ 18
SEMICONDUCTOR DATA,	
TRANSISTORS	19
FIELD EFFECT TRANSISTORS	19
DIODES, LED'S	19
ZENER DIODES	19
INTEGRATED CIRCUITS	20

SPECIFICATIONS

BETA 30

Preamplifier Section

Total Harmonic Distortion (at 1,000 Hz).

Phono (MC) to Rec Out (at 7 V output):
..... no more than 0.006%
Phono (MM) to Rec Out (at 7 V output):
..... no more than 0.006%
Aux to Pre Out (at 1.8V output):
..... no more than 0.008%

Input Sensitivity (at 1,000 Hz, 1V output),

Phono (MC): 0.25 mV \pm 2 dB
Phono (MM): 2.5 mV \pm 2 dB
Tuner: 150 mV \pm 2 dB
Aux: 150 mV \pm 2 dB

Input Impedance (at 1,000 Hz),

Phono (MC): 100 \pm 10 ohms
Phono (MM): 47 \pm 5 kohms
Tuner: 47 \pm 10 kohms
Aux: 47 \pm 10 kohms
Tape 1, 2: 47 \pm 10 kohms

Signal to Noise Ratio with IHF-A Network,

Phono (MC): more than 62 dB
Phono (MM): more than 82 dB
Tuner: more than 90 dB
Aux: more than 90 dB
Tape 1, 2: more than 90 dB

Frequency Response (20 to 20,000 Hz),

Tuner: +0, -1 dB
Aux: +0, -1 dB
Tape 1, 2: +0, -1 dB

RIAA Equalization Deviation (30 to 15,000 Hz),

Phono (MM) to Rec Out: \pm 1 dB

Tone Control,

Bass (70 Hz): +7, -9 dB
Treble (10 kHz): +7, -9 dB

Muting Delay Time: 4 \pm 2 seconds

General

Power Requirement,

U.S.A. & Canada model: AC 120V/60 Hz
European model: AC 220V/50 Hz
U.K. & Australia model: AC 240V/50 Hz

Power Consumption: 10 watts

Specifications are subject to change without notice.

Dimensions,

Width: 482 mm, 19" (BETA 30)
440 mm, 17-3/8" (BETA 30s)

Height: 70 mm, 2-3/4"

Depth: 258 mm, 10-1/8"

Weight without package: 4.8 kg, 10.6 lbs

BETA 50**Preamplifier Section**

Total Harmonic Distortion (at 1,000 Hz).

Phono (MC) to Rec Out (at 7 V output):

. no more than 0.006%

Phono (MM) to Rec Out (at 7 V output):

. no more than 0.006%

Aux to Pre Out (at 1.8 V output):

. no more than 0.08%

Input Sensitivity (at 1,000 Hz, 1 V output),

Phono (MC): 0.25 mV \pm 2 dBPhono (MM): 2.5 mV \pm 2 dBTuner: 150 mV \pm 2 dBAux: 150 mV \pm 2 dB

Input Impedance (at 1,000 Hz),

Phono (MC): 100 \pm 10 ohmsPhono (MM): 47 \pm 5 kohmsTuner: 47 \pm 10 kohmsAux: 47 \pm 10 kohmsTape 1, 2: 47 \pm 10 kohms

Signal to Noise Ratio with IHF-A Network,

Phono (MC): more than 62 dB

Phono (MM): more than 82 dB

Tuner: more than 90 dB

Aux: more than 90 dB

Tape 1, 2: more than 90 dB

Frequency Response (20 to 20,000 Hz),

Tuner: +0, -1 dB

Aux: +0, -1 dB

Tape 1, 2: +0, -1 dB

RIAA Equalization Deviation (30 to 15,000 Hz),

Phono (MM) to Rec Out: \pm 1 dB

Tone Control,

Bass (70 Hz): +7, -9 dB

Treble (10 kHz): +7, -9 dB

CX*NR Input Level,

Calibration VR Max: 120 mV \pm 2 dBCalibration VR Min: 640 mV \pm 2 dBMuting Delay Time: 4 \pm 2 seconds**General**

Power Requirement,

U.S.A. & Canada model: AC 120V/60 Hz

European model: AC 220V/50 Hz

U.K. & Australia model: AC 240V/50 Hz

Power Consumption: 13 watts

Dimensions,

Width: 482 mm, 19" (BETA 50)

440 mm, 17-3/8" (BETA 50s)

Height: 70 mm, 2-3/4"

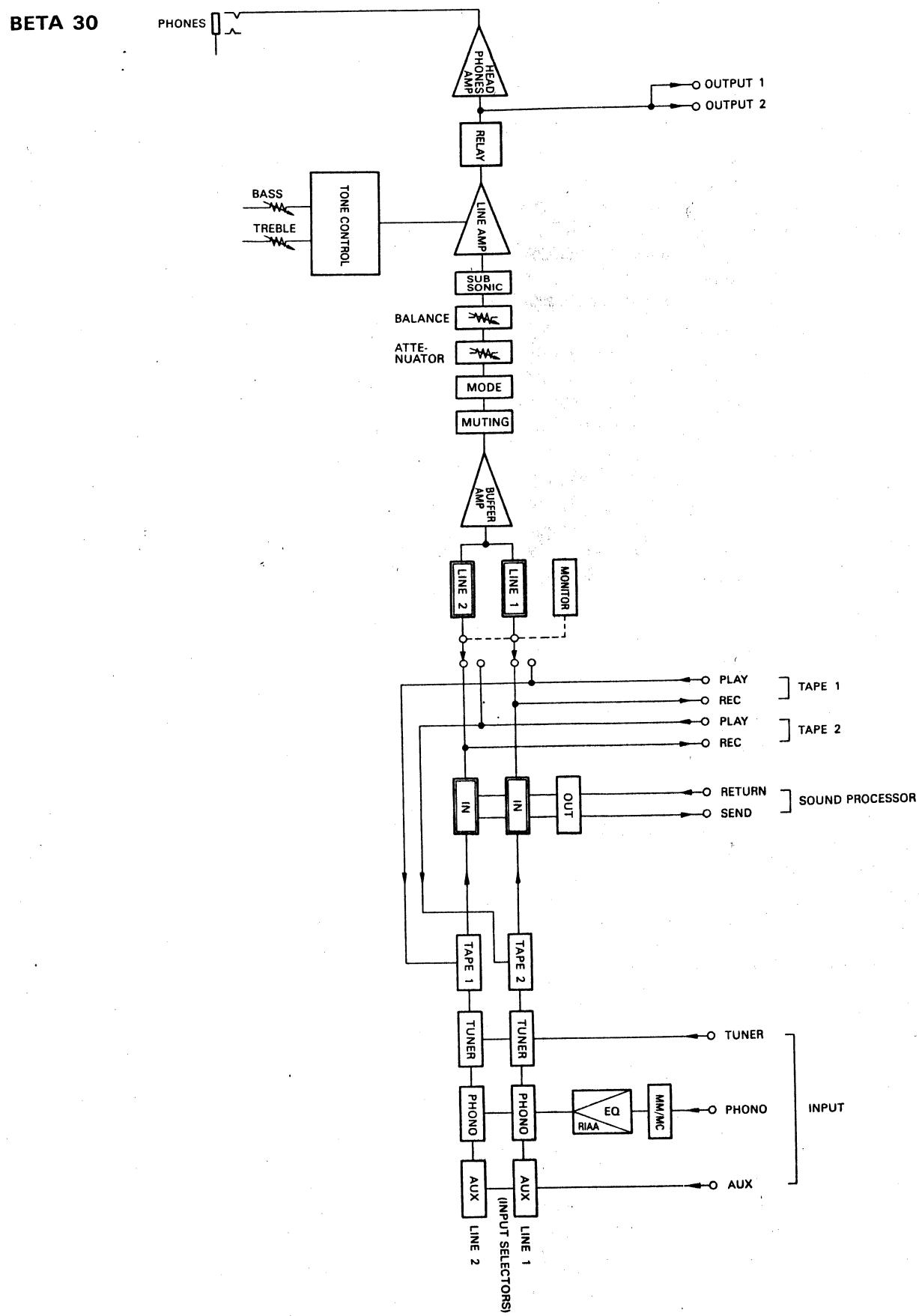
Depth: 258 mm, 10-1/8"

Weight without package: 4.8 kg, 10.6 lbs

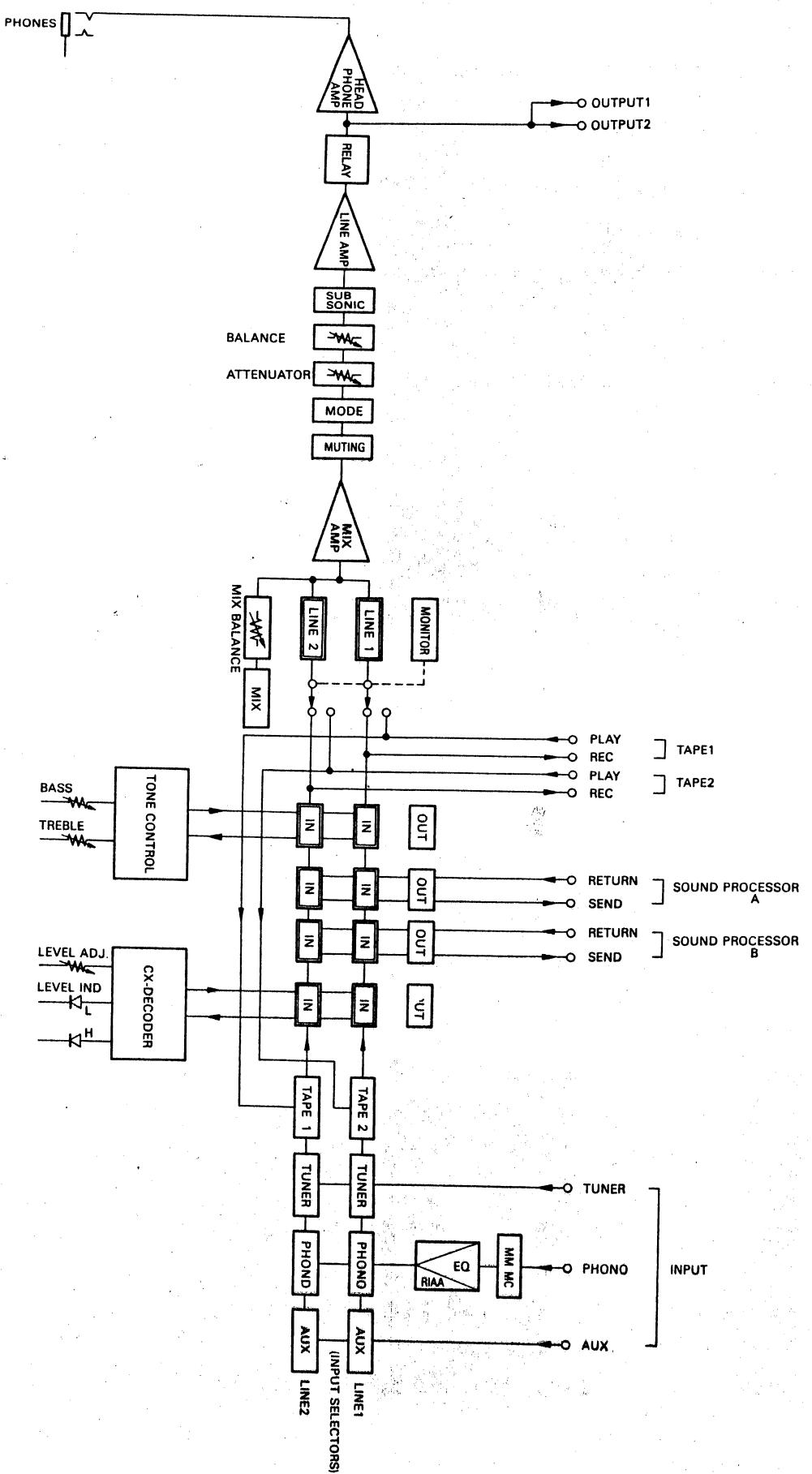
Specifications are subject to change without notice.

* CX is a trademark of CBS Inc.

BLOCK DIAGRAM



BETA 50



DISASSEMBLY

1. CABINET COVER REMOVAL

- Remove four tapping screws from the top of the metal cover.
- Remove four screws from both sides of the metal cover.
- Lift the cabinet cover away from the unit.

2. BOTTOM PLATE REMOVAL

- Remove seven tapping screws (#1~7) as shown in Photo 1.

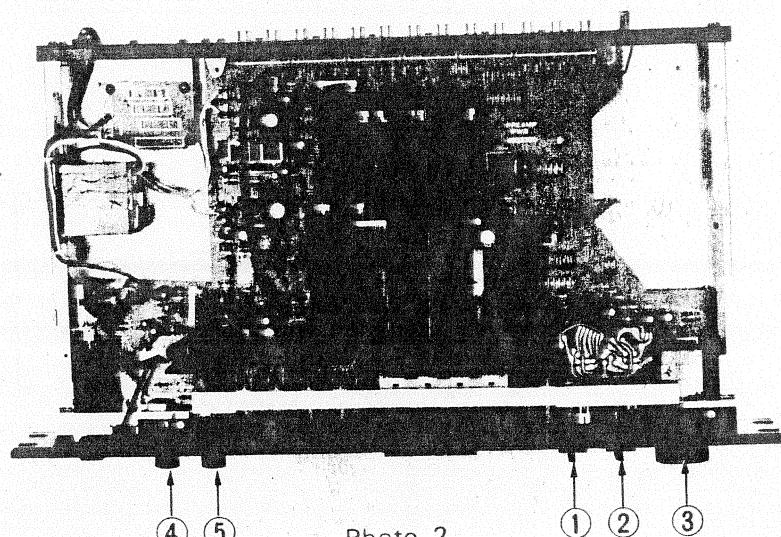
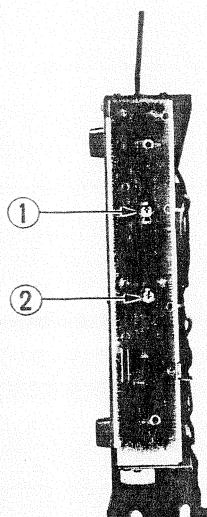
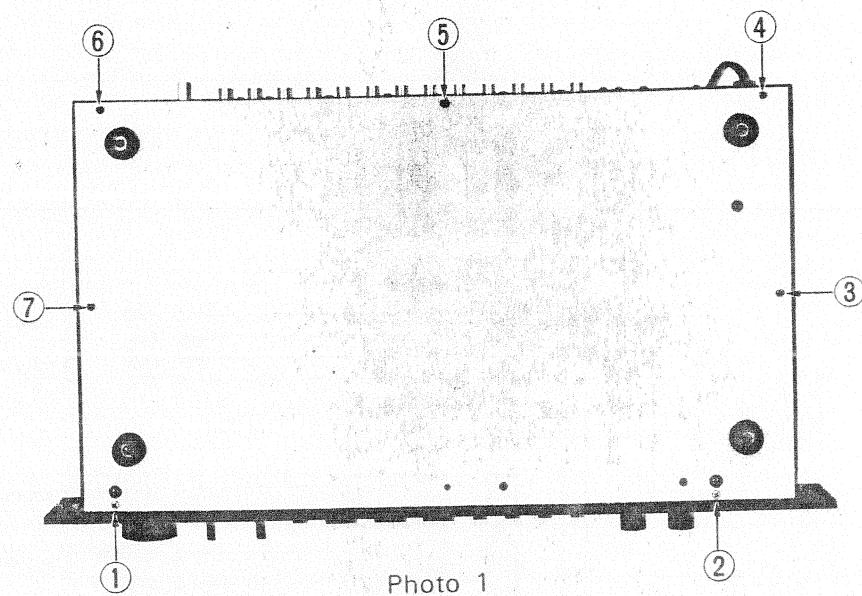
3. FRONT PANEL REMOVAL

- Remove two (or one) knobs (#1, 2 Photo 2) from the front panel by pulling them forward.

- Using a hexagonal wrench, remove three knobs (#3 ~ 5) as shown in Photo 2.
- Remove two tapping screws from the top of the unit.
- Remove the front panel from the unit.

4. POWER TRANSFORMER REMOVAL

- Disconnect all wires from the power transformer.
- Remove two screws (#1, 2) (Photo 3) from the side plate of the unit.
- Lift the power transformer up and out of chassis.



PARTS LOCATION

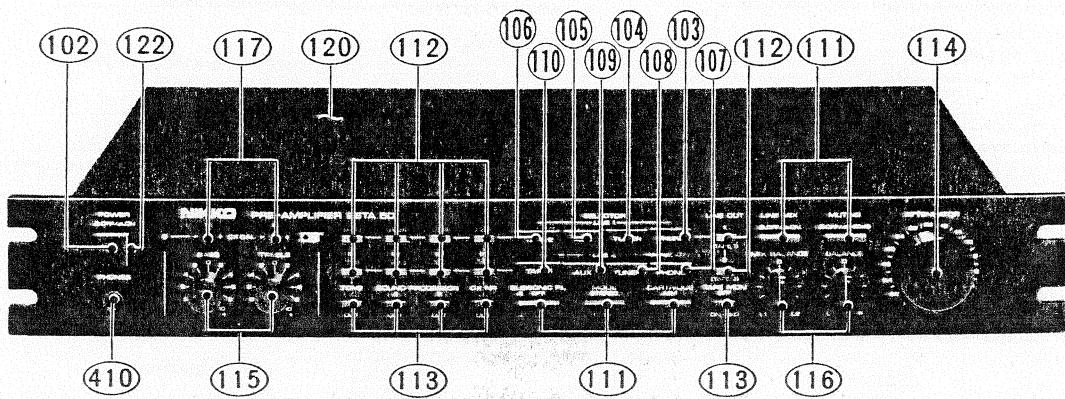


Photo 4

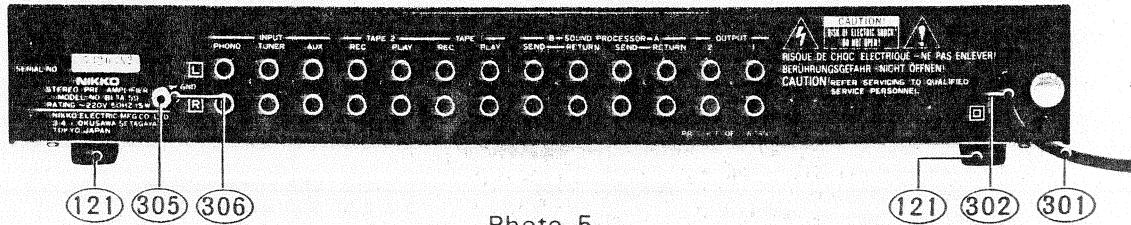


Photo 5

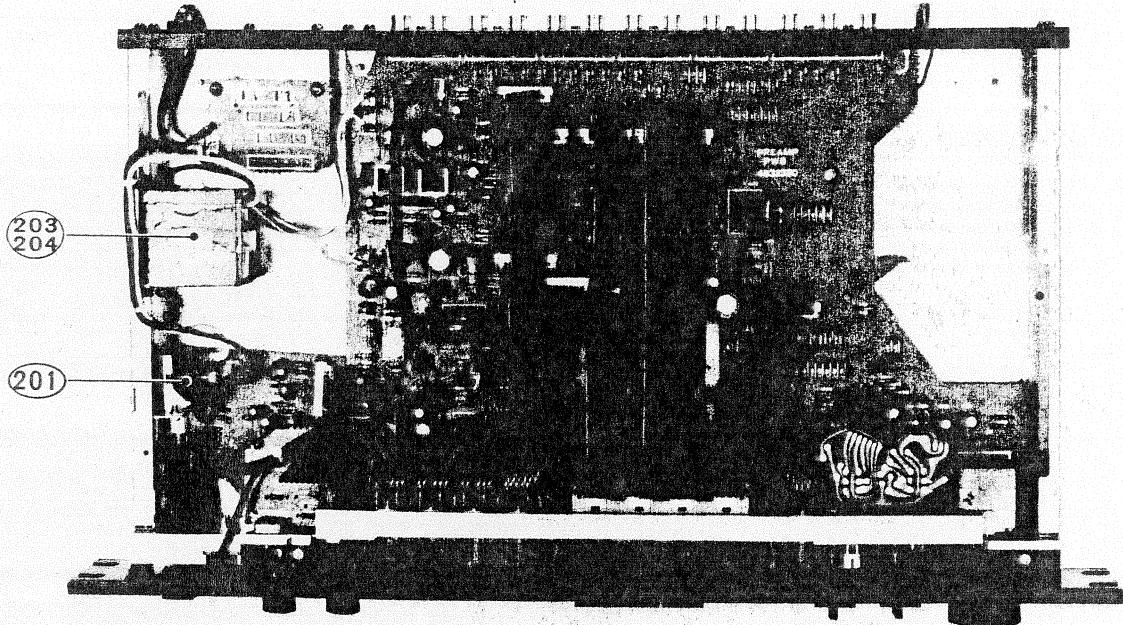


Photo 6

PARTS LIST

NOTES:

1. * The REF. NUMBER (#) marked with a (*) on parts list is related to number of three digits with a (). (Photo 4~6).

2. + Numerals in file indicate the quantity of parts used in one type.

W : U.S.A. & Canada model, AC 120V
 E : European model, AC 220V
 V : Multi-voltage model, AC 110/120/220/240V

3. ++	TR :	Transistor
	FET :	Field effect transistor
	VR :	Volume control (Variable resistor)
	MO-RES :	Metal oxide film fixed resistor
	CEM-RES :	Cemented wirewound fixed resistor
	FP :	Flame proof
	C-CAP :	Ceramic capacitor
	E-CAP :	Aluminum electrolytic capacitor
	M-CAP :	Polyester film capacitor
	S-CAP :	Polystyrene film capacitor
	T-CAP :	Tantalum electrolytic capacitor

BP-CAP : Bipolar electrolytic capacitor
 LC-CAP : Low current leakage electrolytic capacitor

4. Assemblies and parts are subject to change without notice.

5. Parts ordering procedure:

A. DO NOT USE THE "REFERENCE" number and "SYMBOL" number. (these are control # for the factory only)

B. Include in any order

a. Part number. b. Part description. c. Model number.
 (any of the above lacking from an order may delay shipment of that order.)

WARNING

 INDICATES SAFETY CRITICAL COMPONENTS.
 FOR CONTINUED SAFETY, REPLACE SAFETY CRITICAL COMPONENTS
 ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

REF.	SYMBOL	MODEL	PART	
No.	No.	W E W E	DESCRIPTION	No.
30 30s 50 50s				

PACKING MATERIALS & ACCESSORIES

001a	1 - - -	Carton box - BETA 30	9826740
001b	- 1 - -	Carton box - BETA 30s	9826770
001c	- - 1 -	Carton box - BETA 50	9826750
001d	- - - 1	Carton box - BETA 50s	9826780
002	2 2 2 2	Pad	9841230
003	1 1 1 1	Sack, polyethylen cloth	9640720
004a	1 - - -	Manual, instructions - in English and French - BETA 30	960429E
004b	1 1 - -	Manual, instructions - in five different languages - BETA 30/s	960429K
004c	- - 1 -	Manual, instructions - in English and French - BETA 50	960430E
004d	- - 1 1	Manual, instructions - in five different languages - BETA 50/s	960430K
005	1 1 1 1	Manual, voltage selection - V-type only	960402K
006	1 - 1 -	Card, warranty - U.S.A. only	967046A
007	1 - 1 -	List, service stations - U.S.A. only	9690300
008	1 1 1 1	Cord, RCA phono pin plug	962026A
009	1 1 1 1	Adaptor, AC plug - V-type only	4550230

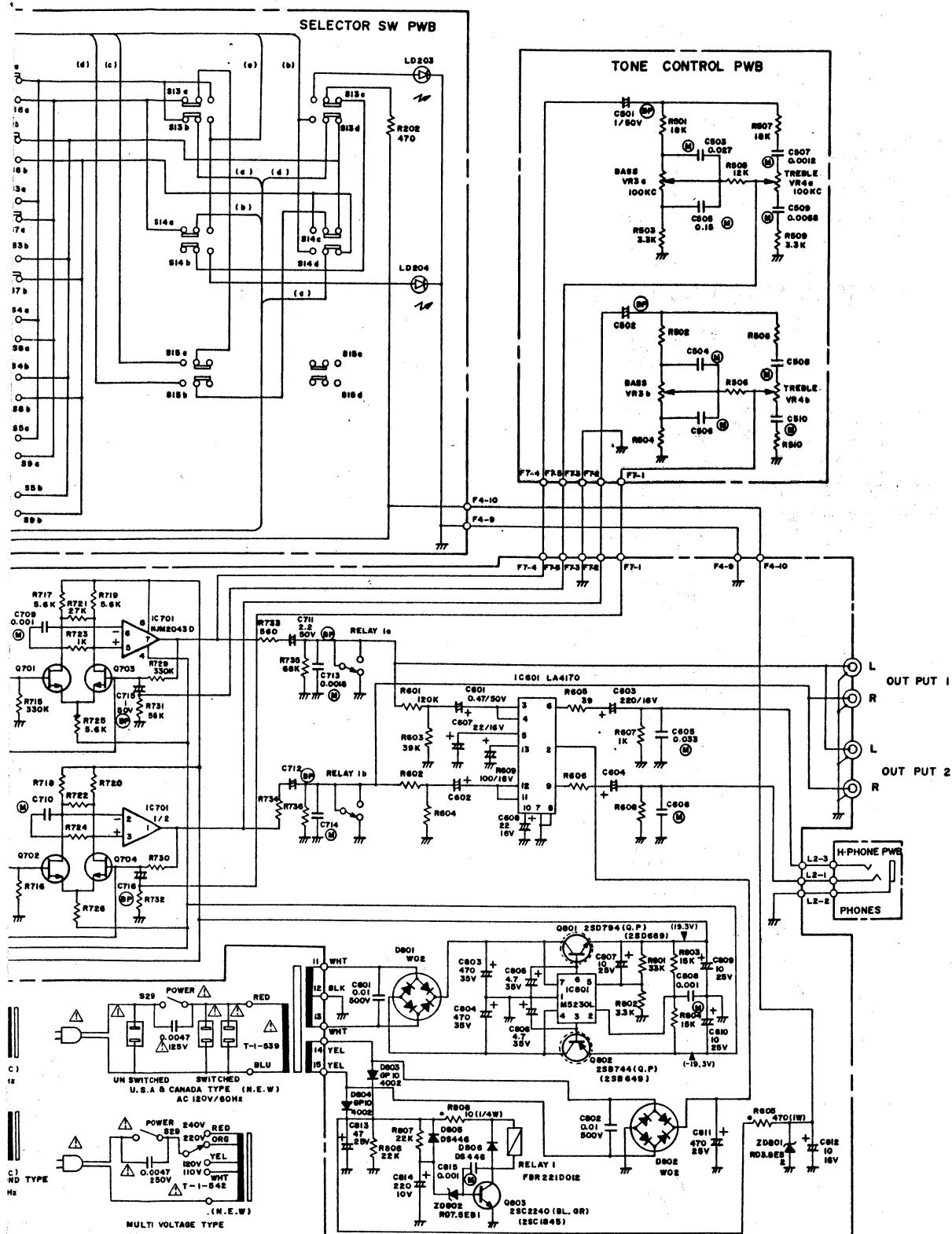
CABINET ASSEMBLY

★101a	1 - - -	Front panel assembly - BETA 30	7886390
★101b	- 1 - -	Front panel assembly - BETA 30s	7886380
★101c	- - 1 -	Front panel assembly - BETA 50	7886410
★101d	- - - 1	Front panel assembly - BETA 50s	7886400
★102a	1 - 1 -	Button, push - M15SQ-BK - power, BLACK	7852390
★102b	- 1 - 1	Button, push - M15SQ-SL - power, SILVER	7853930
★103	1 1 1 1	Button, push - P819BK-PHON-1 - phono 1	7853820
★104	1 1 1 1	Button, push - P819BK-TUN-1 - tuner 1	7853830
★105	1 1 1 1	Button, push - P819BK-AUX-1 - aux 1	7853840
★106	1 1 1 1	Button, push - P819BK-TPE-2 - tape 2	7853860
★107	1 1 1 1	Button, push - P819BK-PHON-2 - phono 2	7853870
★108	1 1 1 1	Button, push - P819BK-TUN-2 - tuner 2	7853880
★109	1 1 1 1	Button, push - P819BK-AUX-2 - aux 2	7853890
★110	1 1 1 1	Button, push - P819BK-TPE-1 - tape 1	7853850
★111a	4 - 5 -	Button, push - P319W-BK - subsonic/mode/cartridge/muting/(line mix) - BLACK	7853890
★111b	- 4 - 5	Button, push - P319W-SL - subsonic/mode/cartridge/muting/(line mix) - SILVER	7853700

REF.	SYMBOL	MODEL	PART	
No.	No.	W E W E	DESCRIPTION	No.
30 30s 50 50s				
★112	4 4 10 10	Button, push - P309B-C - others, CLEAR	7853800	
★113	2 2 5 5	Button, push - P309B-BK - others, BLACK	7853810	
★114a	1 - 1 -	Knob - 2BK-34D - attenuator, BLACK	7851740	
★114b	- 1 - 1	Knob - 2SL-34D - attenuator, SILVER	7841880	
★115a	1 - 1 -	Knob - 30BK-16R - bass/treble, BLACK	7841870	
★115b	- 1 - 1	Knob - 30SL-16R - bass/treble, SILVER	7841860	
★116	1 1 2 2	Knob - P2BK-1613DL - balance/ (mix balance)	7852350	
★117a	- - 2 -	Knob - 30BK-5.5R - CX cal., BLACK	7841920	
★117b	- - - 2	Knob - 30SL-5.5R - CX cal., SILVER	7841910	
118	1 1 2 2	Shaft, extension - 16.5M	7405030	
119	3 3 3 3	Shaft, extension - 63M	7403450	
★120	1 1 1 1	Cover, top	7821510	
★121	4 4 4 4	Foot, plastic	7403520	
★122	1 1 1 1	Guide, button P15S9BK power switch	7402680	

REF.	SYMBOL	TYPE	PART	
NO.	NO.	W E V W E V	DESCRIPTION	NO.
CHASSIS ASSEMBLY				
★201a	1 - - -	Switch, push-power - U.S.A. & Canada type	4042620	
★201b	- 1 - -	Switch, push-power other type	4041870	
★202	- - 1 -	C-CAP, 0.0047uf	239472A	
★203a	- - - 1	Transformer, power T-1-639 - AC 120V	1105390	
★203b	- - - 1	Transformer, power T-1-540 - AC 220V	1106400	
★203c	- - - 1	Transformer, power T-1-542 - AC 110/20/220/240V	1105420	
★204a	- - - 1	Transformer, power T-1-543 - AC 120V	1106430	
★204b	- - - 1	Transformer, power T-1-544 - AC 220V	1106440	
★204c	- - - 1	Transformer, power T-1-546 - AC 110/20/220/240V	1106460	
BACK PLATE ASSEMBLY				
★301	1 - - -	Cord, power - DP-70 - U.S.A. type	740607A	
★301	- - 1 -	Cord, power for P309 only - 9-11A multi-voltage type	740607A	
★301b	- - - 1	Cord, power - SP-2 - Canada type	80500BA	
★301c	- - - 1	Cord, power - DE-27 - Europe type	805010A	
★302	- - - 1	Cord, power cord - 9E-2P 4 - U.S.A. type & multi-voltage type	7406020	
★302b	- - - 1	Cord, power cord - 9E-2P 4 - Canada & Europe type	7406080	
★303a	3 - - 3 -	Socket, AC outlet - U.S.A. type	4500190	
★303b	3 - - 3 -	Socket, AC outlet - Canada type	4500200	
★304	- - - 1	Switch, rotary - AC voltage selector	1108640	
★305	1 1 1 1 1 1	Shaft, GND terminal	7152050	
★306	1 1 1 1 1 1	Nut, GND terminal	7152060	

more → P.16



SEMICONDUCTORS



2SC2240



2SB744
2SD794



2SK117
2SK170



GP10-4002
DS446
RD7.5EB1
RD3.9FB2

NOTES:

1. SCHEMATIC IS SUBJECT TO CHANGE WITHOUT NOTICE.

UNLESS OTHERWISE SPECIFIED:

2. RESISTANCE VALUES ARE IN OHMS.

K=1,000; M=1,000,000

3. CAPACITANCE VALUES 1.0 AND ABOVE ARE IN μ F OR μ F (M= μ F, M= μ F), LESS THAN 1.0 ARE IN μ F (ELECTROLYTIC CAPACITANCE VALUES ARE IN μ F/WV).

4. VOLTAGES ARE MEASURED TO CHASSIS GROUND WITH A "DC VOLTMETER".

SCHEMATIC SYMBOLS:

(\otimes) POLYESTER FILM CAPACITOR
(NO MARK) CERAMIC CAPACITOR
• NONFLAMMABLE RESISTOR

SERVICE INFORMATION:

CAUTION: REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

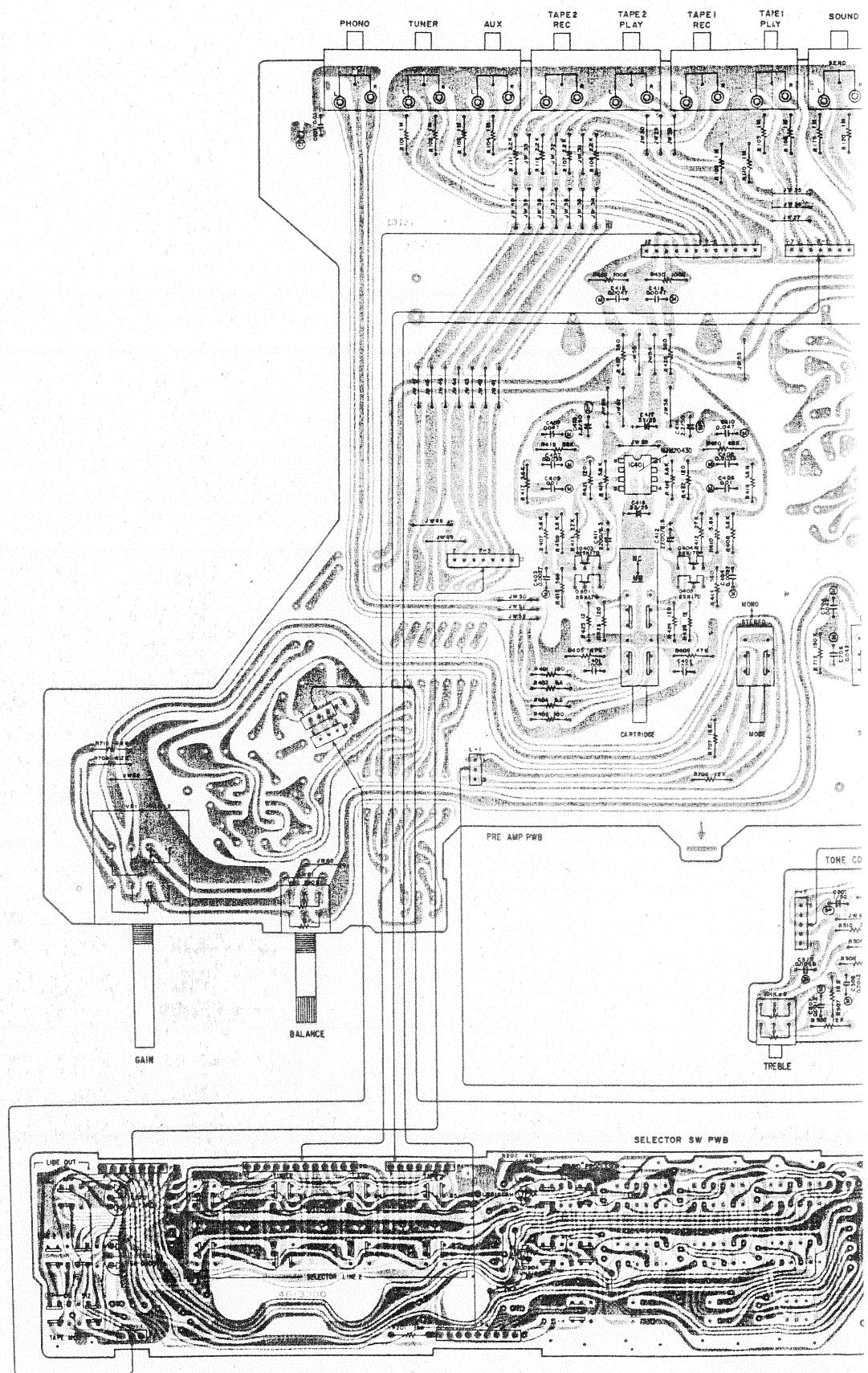
1. EACH PRECAUTION TO BE FOLLOWED DURING SERVICING.

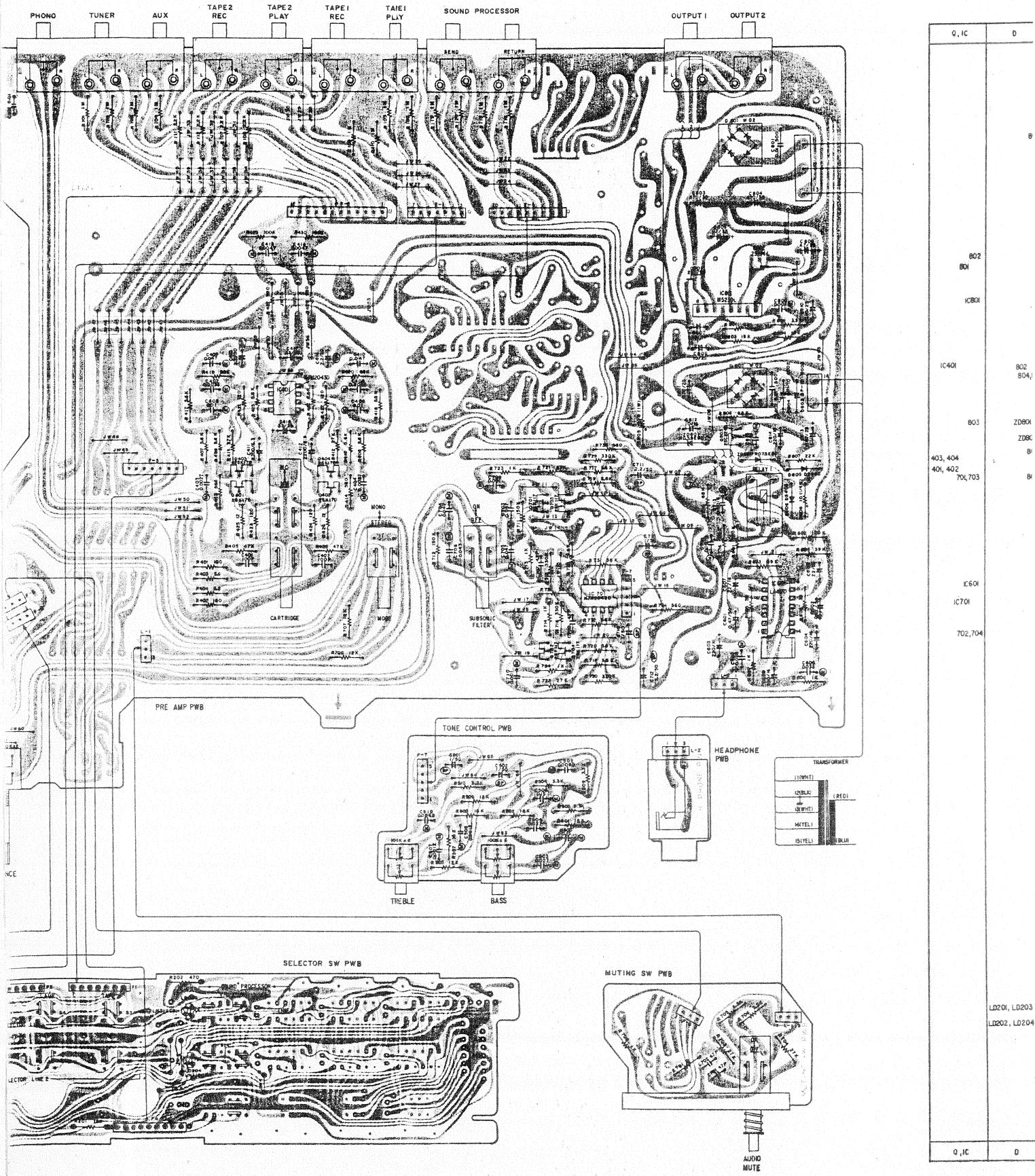
2. \triangle INDICATES SAFETY CRITICAL COMPONENTS FOR CONTINUED SAFETY. REPLACE SAFETY CRITICAL COMPONENTS ONLY WITH MANUFACTURER'S RECOMMENDED PARTS.

3. BEFORE RETURNING THIS APPLIANCE TO THE CUSTOMER, YOU MAKE LEAKAGE-CURRENT AND RESISTANCE MEASUREMENTS TO DETERMINE THAT EXPOSED PARTS ARE ACCEPTABLY INSULATED FROM THE SUPPLY CIRCUIT.

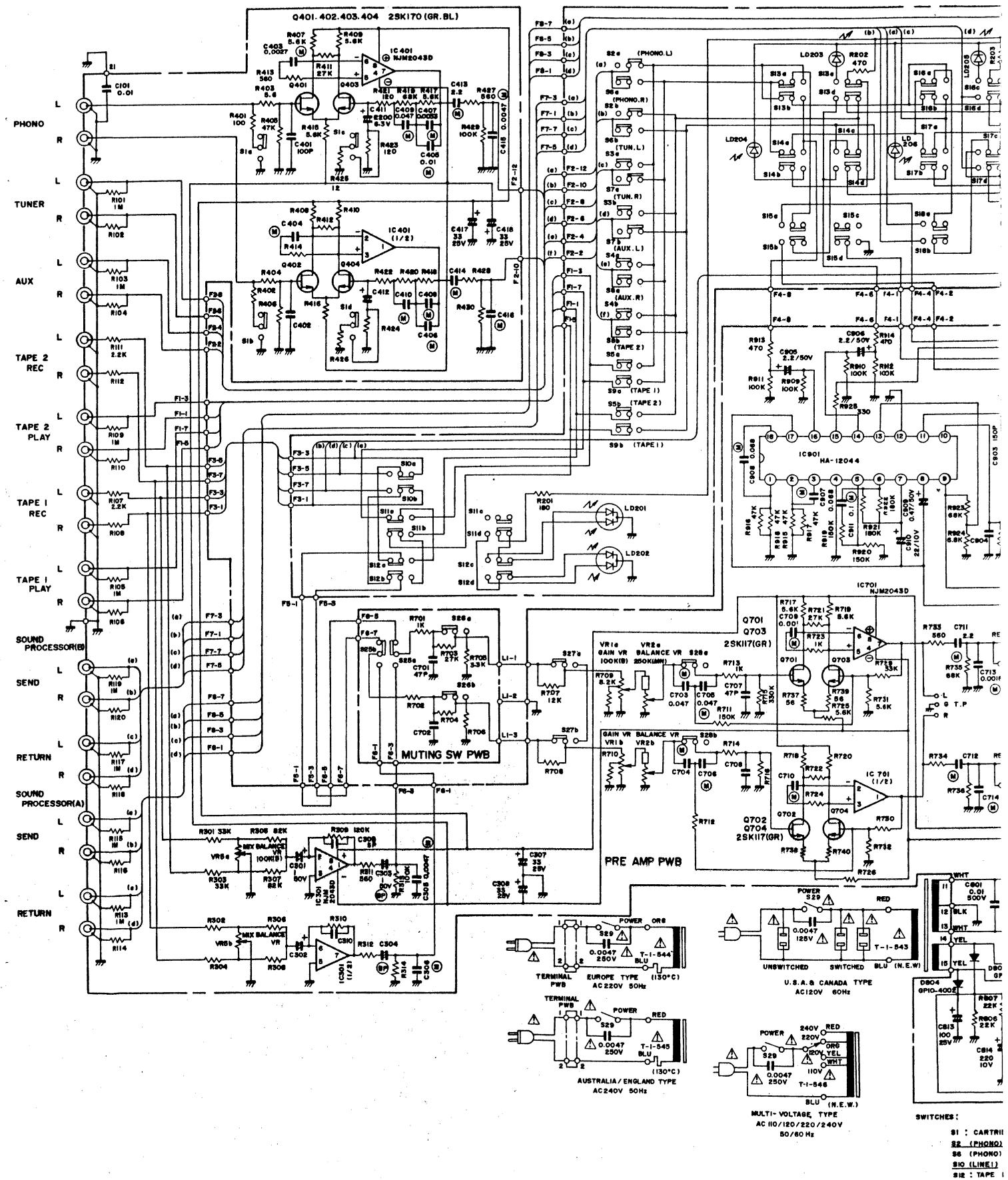
P. C. BOARD (CONDUCTIVE SIDE VIEW)

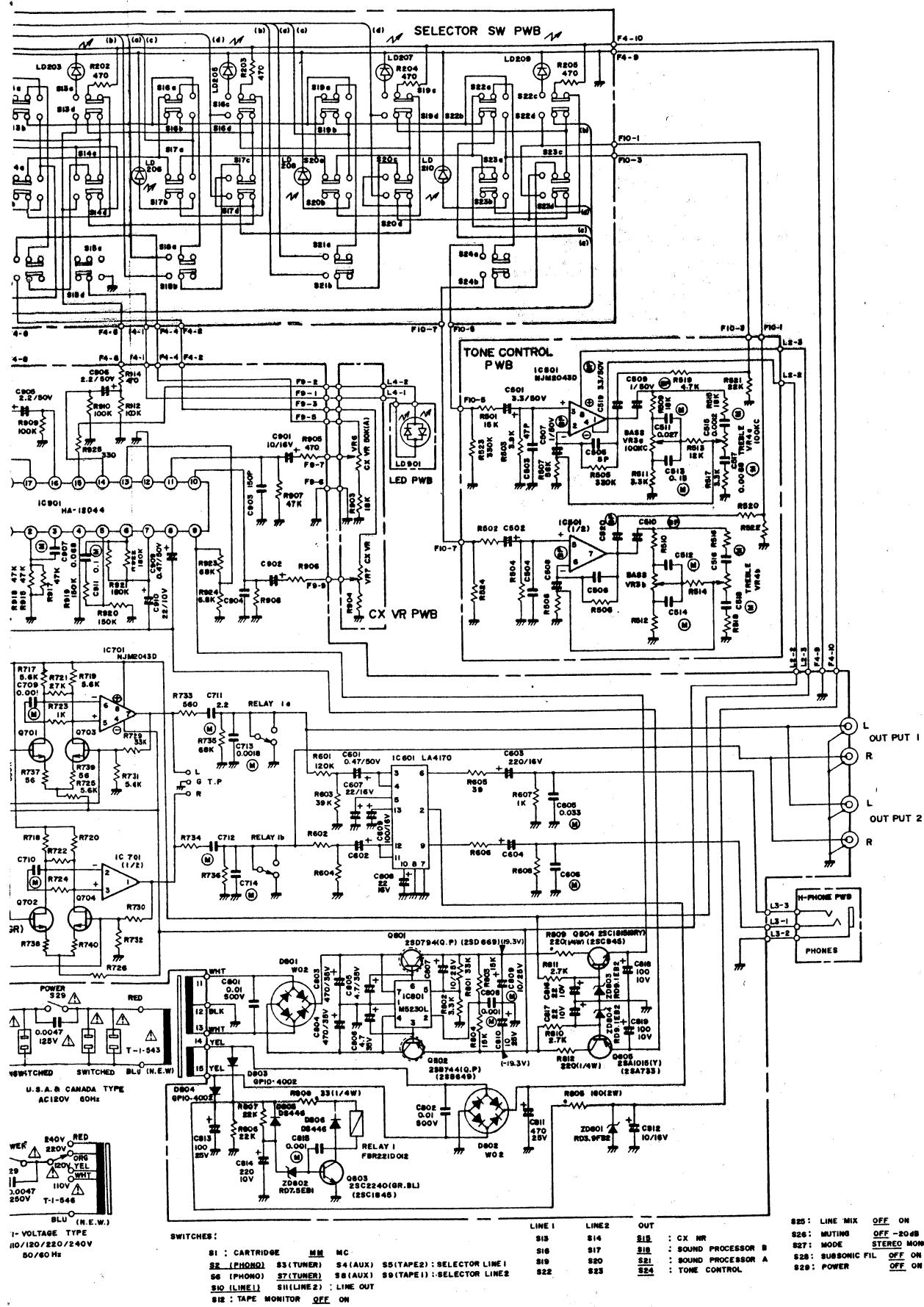
BETA 30





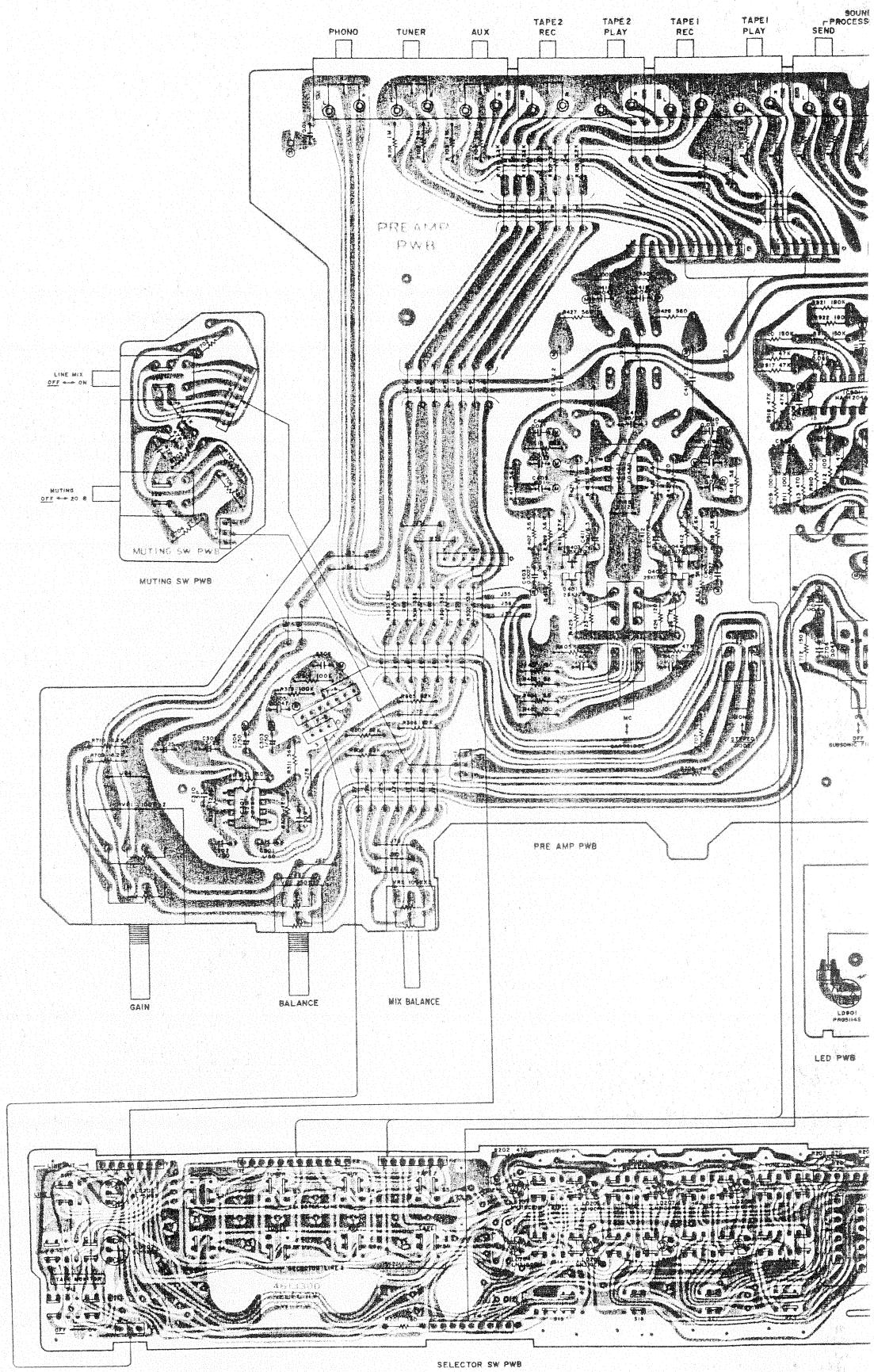
SCHEMATIC DIAGRAM BETA 50

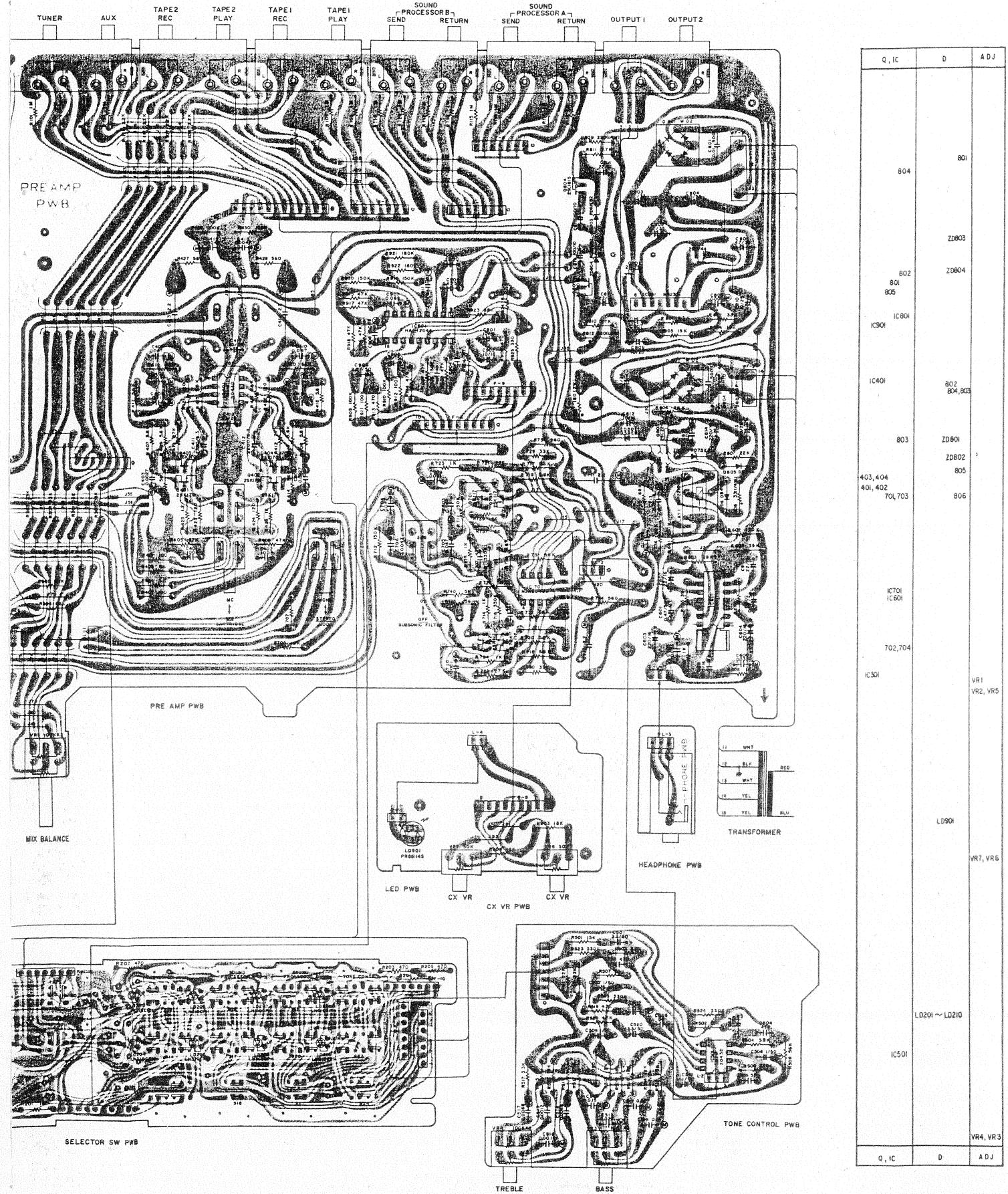




P. C. BOARD (CONDUCTIVE SIDE VIEW)

BETA 50





PARTS ORDERING PROCEDURE ----- DO NOT USE THE "REFERENCE" number and "SYMBOL" number. (these are control # for the factory only) Include in any order: a. Part number b. Part description c. Model number. (any of the above lacking from an order may delay shipment of that order.)

REF.	SYMBOL	TYPE +	DESCRIPTION ++			PART			
No.	No.	W E V				No.			
BETA 30/s PREAMPLIFIER PWB ASSEMBLY									
(TONE CONTROL SECTION)									
401	VR3,4	2 2 2	VR 100kohm (C) x 2 - bass/treble		4321430				
C501,502	2 2 2	BP-CAP 1uf	50V		215510N				
C503,504	2 2 2	M-CAP 0.027uf	5%	50V	222273J				
C505,506	2 2 2	M-CAP 0.15uf	5%	50V	222154J				
C507,508	2 2 2	M-CAP 0.0012uf	5%	50V	222122J				
C509,510	2 2 2	M-CAP 0.0068uf	5%	50V	222682J				
R501,502	2 2 2	RES 18kohm	5%	1/4W	328183J				
R503,504	2 2 2	RES 3.3kohm	5%	1/4W	328332J				
R505,506	2 2 2	RES 12kohm	5%	1/4W	328123J				
R507,508	2 2 2	RES 18kohm	5%	1/4W	328183J				
R509,510	2 2 2	RES 3.3kohm	5%	1/4W	328332J				
(TONE AMP SECTION)									
IC701	1 1 1	IC	NJM2043D		518220S				
Q701~704	4 4 4	FET	2SK117 (GR)		516048S				
C707,708	2 2 2	C-CAP 47pf	10%	50V	SL	232470K			
C709,710	2 2 2	M-CAP 0.001uf	5%	50V		222102J			
C711,712	2 2 2	BP-CAP 2.2uf	50V			215512N			
C713,714	2 2 2	M-CAP 0.0018uf	5%	50V		222182J			
C715,716	2 2 2	BP-CAP 1uf	50V			215510N			
R713,714	2 2 2	RES 1kohm	5%	1/4W		328102J			
R715,716	2 2 2	RES 330kohm	5%	1/4W		328334J			
R717~720	4 4 4	RES 5.6kohm	5%	1/4W		328562J			
R712,722	2 2 2	RES 27kohm	5%	1/4W		328273J			
R723,724	2 2 2	RES 1kohm	5%	1/4W		328102J			
R725,726	2 2 2	RES 5.6kohm	5%	1/4W		328562J			
R729,730	2 2 2	RES 330kohm	5%	1/4W		328334J			
R731,732	2 2 2	RES 56kohm	5%	1/4W		328563J			
R733,734	2 2 2	RES 560ohm	5%	1/4W		328561J			
(PUSH SWITCH SECTION)									
402	S1	1 1 1	Switch, mono push - cartridge selector		4042600				
403	S26	1 1 1	Switch, mono push - muting		4042580				
405	S27,28	2 2 2	Switch, mono push - mode/subsonic		4042590				
(TERMINAL SECTION)									
406	1 1 1	Terminal, RCA phono pin jack - 2P x 3		4446050					
407	4 4 4	Terminal, RCA phono pin jack - 2P x 2		4444120					
R101~106	6 6 6	RES 1meg.ohm	5%	1/4W		328105J			
R107,108	2 2 2	RES 2.2kohm	5%	1/4W		328222J			
R109,110	2 2 2	RES 1meg.ohm	5%	1/4W		328105J			
R111,112	2 2 2	RES 2.2kohm	5%	1/4W		328222J			
(EQ AMP SECTION)									
IC401	1 1 1	IC	NJM2043D		518220S				
Q401~404	4 4 4	FET 2SK170 (GR or BL)			516039S				
C101	1 1 1	C-CAP 0.01uf	+80, -20% 50V	YG	231103Z				
C401,402	2 2 2	C-CAP 100pf	10%	50V	SL	232101K			
C403,404	2 2 2	M-CAP 0.0012uf	5%	50V		222122J			
C405,406	2 2 2	M-CAP 0.01uf	5%	50V		222103J			
C407,408	2 2 2	M-CAP 0.0033uf	5%	50V		222332J			
C409,410	2 2 2	M-CAP 0.047uf	5%	50V		222473J			
C411,412	2 2 2	E-CAP 2200uf	6.3V			211042S			
C413,414	2 2 2	BP-CAP 2.2uf	50V			215612N			
C415,416	2 2 2	M-CAP 0.0047uf	5%	50V		222472J			
C417,418	2 2 2	E-CAP 33uf	25V			211323S			
R401,402	2 2 2	RES 100ohm	5%	1/4W		328101J			
R403,404	2 2 2	RES 5.6ohm	5%	1/4W		328568J			

REF.	SYMBOL	TYPE +	DESCRIPTION ++			PART			
No.	No.	W E V				No.			
(MUTING SECTION)									
(VOLUME CONTROL SECTION)									
408	VR1	1 1 1	VR 100kohm (B) x 2			4390180			
409	VR2	1 1 1	VR 250kohm (MN)			4321440			
C701,702	2 2 2	C-CAP 47pf	10%	50V	SL	232470K			
R701,702	2 2 2	RES 1kohm	5%	1/4W		328102J			
R703,704	2 2 2	RES 27kohm	5%	1/4W		328273J			
R705,706	2 2 2	RES 3.3kohm	5%	1/4W		328332J			
(HEADPHONE AMP SECTION)									
*410	1 1 1	Jack, headphones				4550360			
IC601	1 1 1	IC	LA4170			518089S			
C601,602	2 2 2	E-CAP 0.47uf		50V		211505S			
C603,604	2 2 2	E-CAP 220uf		16V		211232S			
C605,606	2 2 2	M-CAP 0.033uf	5%	50V		222332J			
C607,608	2 2 2	E-CAP 22uf		16V		211222S			
C609	1 1 1	E-CAP 100uf		16V		211230S			
R601,602	2 2 2	RES 120kohm	5%	1/4W		328124J			
R603,604	2 2 2	RES 39kohm	5%	1/4W		328393J			
R605,606	2 2 2	RES 39ohm	5%	1/4W		328390J			
R607,608	2 2 2	RES 1kohm	5%	1/4W		328102J			
(RELAY DRIVE SECTION)									
411	RELAY1	1 1 1	Relay - FBR221D012			1700490			
Q803	1 1 1	TR	2SC2240 (GR or BL)			512102S			
D803,804	2 2 2	Diode GP10-4002				560066S			
D805,806	2 2 2	Diode DS446				501028S			
ZD802	1 1 1	Zener diode RD7.5EB1				502062S			
C813	1 1 1	E-CAP 47uf	25V			211325S			
C814	1 1 1	E-CAP 220uf	10V			211132S			
C815	1 1 1	M-CAP 0.001uf	5%	50V		222102J			
R806,807	2 2 2	RES 22kohm	5%	1/4W		328223J			
R808	1 1 1	FP-RES 10ohm	5%	1/4W		328100L			
(REGULATOR SECTION)									
IC801	1 1 1	IC	M5230L			518221S			
Q801	1 1 1	TR	2SD794 (Q or P)			513131S			
Q802	1 1 1	TR	2SB744 (Q or P)			511127S			
D801,802	2 2 2	Diode W02				560061S			
ZD801	1 1 1	Zener diode RD3.9EB22				502061S			

BETA 30/30s•50/50s

PARTS ORDERING PROCEDURE ----- DO NOT USE THE "REFERENCE" number and "SYMBOL" number. (these are control # for the factory only). Include in any order: a. Part number b. Part description c. Model number. (any of the above lacking from an order may delay shipment of that order.)

REF	SYMBOL	TYPE ⁺	DESCRIPTION ⁺⁺			PART	
			No.	No.	W E V		
C801,802	2 2 2	C-CAP	0.01uf	500V		238103P	
C803,804	2 2 2	E-CAP	470uf	35V		211435S	
C805,806	2 2 2	E-CAP	4.7uf	35V		211415S	
C807	1 1 1	E-CAP	10uf	25V		211320S	
C808	1 1 1	M-CAP	0.001uf	5%	50V	222102J	
C809,810	2 2 2	E-CAP	10uf	25V		211320S	
C811	1 1 1	E-CAP	470uf	25V		211335S	
C812	1 1 1	E-CAP	10uf	16V		211220S	
R801	1 1 1	RES	33kohm	5%	1/4W	328333J	
R802	1 1 1	RES	3.3kohm	5%	1/4W	328332J	
R803,804	2 2 2	RES	15kohm	5%	1/4W	328153J	
R805	1 1 1	FP-MO-RES	470ohm	5%	1W	361471L	
BETA 30/s: SELECTOR PWB ASSEMBLY							
501	S2~S9	2 2 2	Switch, tetra push	—	input selector	4042540	
502	S10~S12	1 1 1	Switch, tri push	—	line out selector	4042560	
503	S13~S15	1 1 1	Switch, tri push	—	sound processor	4042550	
505	LD201,202	2 2 2	LED	GL-5ND5	— red and green	5060790	
506	LD203,204	2 2 2	LD	LN31GCPH	— green	5060730	
R201	1 1 1	RES	180ohm	5%	1/4W	328181J	
R202	1 1 1	RES	470ohm	5%	1/4W	328471J	
BETA 50/s: PREAMPLIFIER PWB ASSEMBLY							
(TONE CONTROL SECTION)							
401	VR3, 4	2 2 2	VR	100kohm (C)	x 2 — bass/treble	4321430	
IC501	1 1 1	IC	NJM2043D			518220S	
C501,502	2 2 2	E-CAP	3.3uf	50V		211513S	
C503,504	2 2 2	C-CAP	47pf	10%	50V	SL	232470K
C505,506	2 2 2	C-CAP	5pf ± 0.5pf	50V	SL	232509D	
C507~510	4 4 4	BP-CAP	1uf	50V		215510N	
C511,512	2 2 2	M-CAP	0.027uf	5%	50V	222273J	
C513,514	2 2 2	M-CAP	0.15uf	5%	50V	222154J	
C515,516	2 2 2	M-CAP	0.0012uf	5%	50V	222122J	
C517,518	2 2 2	M-CAP	0.0068uf	5%	50V	222682J	
C519,520	2 2 2	BP-CAP	3.3uf	50V		215513N	
R501,502	2 2 2	RES	15kohm	5%	1/4W	328153J	
R503,504	2 2 2	RES	3.9kohm	5%	1/4W	328392J	
R505,506	2 2 2	RES	330kohm	5%	1/4W	328334J	
R507,508	2 2 2	RES	56kohm	5%	1/4W	328563J	
R509,510	2 2 2	RES	18kohm	5%	1/4W	328183J	
R511,512	2 2 2	RES	3.3kohm	5%	1/4W	328332J	
R513,514	2 2 2	RES	12kohm	5%	1/4W	328123J	
R515,516	2 2 2	RES	18kohm	5%	1/4W	328183J	
R517,518	2 2 2	RES	3.3kohm	5%	1/4W	328332J	
R519,520	2 2 2	RES	4.7kohm	5%	1/4W	328472J	
R521,522	2 2 2	RES	22kohm	5%	1/4W	328223J	
R523,524	2 2 2	RES	330kohm	5%	1/4W	328334J	
(PUSH SWITCH SECTION)							
402	S1	1 1 1	Switch, mono push	—	cartridge selector	4042600	
404	S25,26	1 1 1	Switch, twin push	—	line mix/muting	4042530	
405	S27,28	2 2 2	Switch, mono push	—	mode/subsonic	4042590	
(TERMINAL SECTION)							
406		1 1 1	Terminal, RCA phono pin jack	—	2P x 3	4446050	
407		5 5 5	Terminal, RCA phono pin jack	—	2P x 2	4444120	
R101~106	6 6 6	RES	1meg.ohm	5%	1/4W	328105J	
R107,108	2 2 2	RES	2.2kohm	5%	1/4W	328222J	
R109,110	2 2 2	RES	1meg.ohm	5%	1/4W	328105J	

REF	SYMBOL	TYPE ⁺	DESCRIPTION ⁺⁺			PART	
			No.	No.	W E V		
R111,112	2 2 2	RES	2.2kohm	5%	1/4W	328222J	
R113~120	8 8 8	RES	1meg.ohm	5%	1/4W	328105J	
(EQ AMP SECTION)							
IC401	1 1 1	IC	NJM2043D			518220S	
Q401~404	4 4 4	FET	2SK170 (GR or BL)			516039S	
C101	1 1 1	C-CAP	0.01uf	+80, -20%	50V	YG	231103Z
C401,402	2 2 2	C-CAP	100pf	10%	50V	SL	232101K
C403,404	2 2 2	M-CAP	0.0012uf	5%	50V		222122J
C405,406	2 2 2	M-CAP	0.01uf	5%	50V		222103J
C407,408	2 2 2	M-CAP	0.0033uf	5%	50V		222332J
C409,410	2 2 2	M-CAP	0.047uf	5%	50V		222473J
C411,412	2 2 2	E-CAP	2200uf		6.3V		211042S
C413,414	2 2 2	M-CAP	2.2uf	10%	250V		285225K
C415,416	2 2 2	M-CAP	0.0047uf	5%	50V		222472J
C417,418	2 2 2	E-CAP	33uf		25V		211323S
R401,402	2 2 2	RES	100ohm	5%	1/4W	328101J	
R403,404	2 2 2	RES	5.6ohm	5%	1/4W	328568J	
R405,406	2 2 2	RES	47kohm	5%	1/4W	328473J	
R407~410	4 4 4	RES	5.6kohm	5%	1/4W	328562J	
R411,412	2 2 2	RES	27kohm	5%	1/4W	328273J	
R413,414	2 2 2	RES	150ohm	5%	1/4W	328151J	
R415~418	4 4 4	RES	5.6kohm	5%	1/4W	328562J	
R419,420	2 2 2	RES	68kohm	5%	1/4W	328683J	
R421~424	4 4 4	RES	120ohm	5%	1/4W	328121J	
R425,426	2 2 2	RES	120hm	5%	1/4W	328120J	
R427,428	2 2 2	RES	560ohm	5%	1/4W	328561J	
R429,430	2 2 2	RES	100kohm	5%	1/4W	328104J	
(MUTING SECTION)							
C701,702	2 2 2	C-CAP	47pf	10%	50V	SL	232470K
R701,702	2 2 2	RES	1kohm	5%	1/4W		328102J
R703,704	2 2 2	RES	27kohm	5%	1/4W		328273J
R705,706	2 2 2	RES	3.3kohm	5%	1/4W		328332J
(FLAT AMP SECTION)							
408	VR1	1 1 1	VR	100kohm (B)	x 2		4390180
409	VR2	1 1 1	VR	250kohm (MN)			4321440
IC701	1 1 1	IC	NJM2043D				518220S
Q701~704	4 4 4	FET	2SK117 (GR)				516048S
C703~706	4 4 4	M-CAP	0.047uf	5%	50V		222473J
C707,708	2 2 2	C-CAP	47pf	10%	50V	SL	232470K
C709,710	2 2 2	M-CAP	0.001uf	5%	50V		222102J
C711,712	2 2 2	M-CAP	2.2uf	10%	250V		285225K
C713,714	2 2 2	M-CAP	0.0018uf	5%	50V		222182J
R709,710	2 2 2	RES	8.2kohm	5%	1/4W		328822J
R711,712	2 2 2	RES	150kohm	5%	1/4W		328154J
R713,714	2 2 2	RES	1kohm	5%	1/4W		328102J
R715,716	2 2 2	RES	330kohm	5%	1/4W		328334J
R717~720	4 4 4	RES	5.6kohm	5%	1/4W		328562J
R721,722	2 2 2	RES	27kohm	5%	1/4W		328273J
R723,724	2 2 2	RES	1kohm	5%	1/4W		328102J
R725,726	2 2 2	RES	5.6kohm	5%	1/4W		328562J
R729,730	2 2 2	RES	33kohm	5%	1/4W		328333J
R731,732	2 2 2	RES	5.6kohm	5%	1/4W		328562J
R733,734	2 2 2	RES	560ohm	5%	1/4W		328661J
R735,736	2 2 2	RES	68kohm	5%	1/4W		328683J
R737~740	4 4 4	RES	56ohm	5%	1/4W		328560J

PARTS ORDERING PROCEDURE ----- DO NOT USE THE "REFERENCE" number and "SYMBOL" number. (these are control # for the factory only). Include in any order: a. Part number b. Part description c. Model number. (any of the above lacking from an order may delay shipment of that order.)

REF.	SYMBOL	TYPE ⁺	DESCRIPTION ⁺⁺			PART	
No.	No.	W E V				No.	
(CX NR SECTION)							
IC901	1 1 1	IC	HA-12044			518224S	
Q804	1 1 1	TR	2SC1815 (Y or GR)			512107S	
Q805	1 1 1	TR	2SA1015 (Y)			510102S	
ZD803,804	2 2 2	Zener diode RD9.1EB2				502055S	
C816,817	2 2 2	E-CAP	22uf	10V		211122S	
C818,819	2 2 2	E-CAP	100uf	10V		211130S	
C901,902	2 2 2	E-CAP	10uf	16V		211220S	
C903,904	2 2 2	C-CAP	150pf	10%	50V	SL	232151K
C905,906	2 2 2	E-CAP	2.2uf	50V			211512S
C907,908	2 2 2	M-CAP	0.068uf	5%	50V		222683J
C909	1 1 1	E-CAP	0.47uf	50V			211505S
C910	1 1 1	E-CAP	22uf	10V			211122S
C911	1 1 1	M-CAP	0.1uf	5%	50V		222104J
R809,812	2 2 2	FP-RES	220ohm	5%	%W		328221L
R810,811	2 2 2	RES	2.7kohm	5%	%W		328272J
R905,906	2 2 2	RES	470ohm	5%	%W		328471J
R907,908	2 2 2	RES	47kohm	5%	%W		328473J
R909~912	4 4 4	RES	100kohm	5%	%W		328104J
R913,914	2 2 2	RES	470ohm	5%	%W		328471J
R915~918	4 4 4	RES	47kohm	5%	%W		328473J
R919,920	2 2 2	RES	150kohm	5%	%W		328154J
R921,922	2 2 2	RES	180kohm	5%	%W		328184J
R923	1 1 1	RES	68kohm	5%	%W		328683J
R924	1 1 1	RES	6.8kohm	5%	%W		328682J
R925	1 1 1	RES	330ohm	5%	%W		328331J
(HEADPHONE AMP SECTION)							
*410	1 1 1	Jack, headphones				4550360	
IC601	1 1 1	IC	LA4170			518089S	
C601,602	2 2 2	E-CAP	0.47uf	50V			211505S
C603,604	2 2 2	E-CAP	220uf	16V			211232S
C605,606	2 2 2	M-CAP	0.033uf	5%	50V		222333J
C607,608	2 2 2	E-CAP	22uf	16V			211222S
C609	1 1 1	E-CAP	100uf	16V			211230S
(RELAY DRIVE SECTION)							
411	RELAY1	1 1 1	Relay - FBR221D012			1700490	
Q803	1 1 1	TR	2SC2240 (GR or BL)			512102S	
D803,804	2 2 2	Diode	GP10-4002			560066S	
D805,806	2 2 2	Diode	DS446			501028S	
ZD802	1 1 1	Zener diode	RD7.5EB1			502062S	
C813	1 1 1	E-CAP	100uf	25V			211330S
C814	1 1 1	E-CAP	220uf	10V			211132S
C815	1 1 1	M-CAP	0.001uf	5%	50V		222102J
R806,807	2 2 2	RES	22kohm	5%	%W		328223J
R808	1 1 1	FP-RES	33ohm	5%	%W		328330L
(MIXING AMP SECTION)							
412	VR5	1 1 1	VR	100kohm (B) x 2		4321450	
IC301	1 1 1	IC	NJM2043D			518220S	
C301,302	2 2 2	E-CAP	1uf	60V			211510S
C303,304	2 2 2	BP-CAP	1uf	60V			215510N
C305,306	2 2 2	M-CAP	0.0047uf	5%	50V		222472J
C307,308	2 2 2	E-CAP	33uf	25V			211323S
C309,310	2 2 2	C-CAP	5pf ± 0.5pf	50V	SL		232509D
(REGULATOR SECTION)							
IC801	1 1 1	IC	M5230L			518221S	
Q801	1 1 1	TR	2SD794 (Q or P)			513131S	
Q802	1 1 1	TR	2SB744 (Q or P)			511127S	
D801,802	2 2 2	Diode	W02			560061S	
ZD801	1 1 1	Zener diode	RD3.9FB2			502113S	
C801,802	2 2 2	C-CAP	0.01uf	500V			238103P
C803,804	2 2 2	E-CAP	470uf	35V			211435S
C805,806	2 2 2	E-CAP	4.7uf	35V			211415S
C807	1 1 1	E-CAP	10uf	25V			211320S
C808	1 1 1	M-CAP	0.001uf	5%	50V		222102J
C809,810	2 2 2	E-CAP	10uf	25V			211320S
C811	1 1 1	E-CAP	470uf	25V			211335S
C812	1 1 1	E-CAP	10uf	16V			211220S
R801	1 1 1	RES	33kohm	5%	%W		328333J
R802	1 1 1	RES	3.3kohm	5%	%W		328332J
R803,804	2 2 2	RES	15kohm	5%	%W		328153J
R805	1 1 1	FP-MO-RES	180ohm	5%	2W		362181L
(CX CALIBRATOR SECTION)							
VR6,7	2 2 2	VR	50kohm (A)			4310810	
LED901	1 1 1	LED	PRG5114S - red and green			5060800	
R903,904	2 2 2	RES	18kohm	5%	%W		328183J
BETA 50/s: SELECTOR PWB ASSEMBLY							
501	S2~S9	2 2 2	Switch, tetra push - input selector			4042540	
502	S10~S12	1 1 1	Switch, tri push - line out selector			4042560	
503	S13~S15	1 1 1	Switch, tri push - CX-NR			4042550	
504	S16~S24	3 3 3	Switch, tri push - sound processor/tone			4042570	
505	LD201,202	2 2 2	LED GL-5ND5 - red and green			5060790	
506	LD203~210	8 8 8	LED LN31GCPH - green			5060730	
R201	1 1 1	RES	180ohm	5%	%W		328181J
R202~205	4 4 4	RES	470ohm	5%	%W		328471J

SEMICONDUCTOR DATA

TRANSISTORS

† NOTES Ge: Germanium
Si: SiliconA: Alloy
B: Base
D: Diffused
Dd: Double-diffused
Df: Drift-field
E: Epitaxial
G: Grown
J: Junction
M: Mesa
P: Planar
Pc: Point-contact
Td: Triple-diffused

DEVICE TYPE	APPLICATIONS	STRUCTURE†	MAXIMUM RATINGS Absolute-Maximum Values: (TA = 25°C unless otherwise specified)					ELECTRICAL CHARACTERISTICS Typical Values: (TA = 25°C unless otherwise specified)												MANUFACTURER	
			Collector-to-Base Voltage V _{CBO} (V)	Emitter-to-Base Voltage V _{EBO} (V)	Collector Current I _C (mA)	Collector Dissipation PC (mW)	Junction Temperature T _J (°C)	Collector Cutoff Current I _{CB0} (uA)	V _{CB} (V)	h _{FE}	V _{CE} (V)	I _C (mA)	V _{CE(sat)} (V)	I _C (mA)	I _B (mA)	Gain-Bandwidth Product f _T (MHz)	V _{CEB} (V)	I _E (mA)	I _C (mA)	Output Capacitance C _{OB} (pF)	Others
2SA1015 (Y)	AF, General	PNP Si-E	-50	-5	-150	400	125	-0.1 max.	-50	120 ~ 240	-6	-2	-0.3 max.	-100	-10	80 min.	-10	-1*	7 max.		TOSHIBA
2SB744 (P, Q)	AF, Power amp.	PNP Si-E	-70	-5	-3A	1W	150	-1 max.	-45	100 ~ 320	-5	-500	-2 max.	-1.5A	-150	45	-6	-100*	60		NEC
2SC1815 (Y, GR)	AF, General	NPN Si-E	60	5	150	400	125	0.1 max.	60	120 ~ 400	6	2	0.25 max.	100	10	80 min.	10	1*	3 max.		TOSHIBA
2SC2240 (GR, BL)	AF, Low noise	NPN Si-E	120	5	100	300	125	0.01 max.	120	200 ~ 700	6	2	0.3 max.	10	1	100	6	1*	3		TOSHIBA
2SD794 (P, Q)	AF, Power amp.	NPN Si-E	70	5	3A	1W	150	1 max.	45	100 ~ 320	5	500	2 max.	1.5A	150	60	6	100*	40		NEC

FIELD EFFECT TRANSISTORS

DEVICE TYPE	APPLICATIONS	STRUCTURE†	MAXIMUM RATINGS Absolute-Maximum Values: (TA = 25°C unless otherwise specified)					ELECTRICAL CHARACTERISTICS Typical Values: (TA = 25°C unless otherwise specified)												MANUFACTURER		
			Gate-to-Drain Voltage V _{GDO} (V)	Gate-to-Source Voltage V _{GSO} (V)	Gate Current I _G (mA)	Drain Current I _D (mA)	Total Dissipation P _D (mW)	Channel Temperature T _{ch} (°C)	Gate Leak Current (Test Conditions) I _{GS} (nA)	Gate-to-Drain Breakdown Voltage V _{GD(B)} (V)	Drain Current (Test Conditions) I _{DS} (mA)	Gate-to-Source Cutoff Voltage V _{GS} (V)	Forward Transfer Admittance (Test Conditions) M _{fs} (mA)	Forward Transfer Admittance (Test Conditions) M _{fs} (mA)	Feed Back Capacitance (Test Conditions) C _{FB} (pF)	Power Gain (Common Source) (Test Conditions) G _{PS} (dB)	Noise Figure (Test Conditions) NF (dB)					
2SK117 (GR)	AF, Low noise	Si N-channel Junction	-50		10		300	125	V _{GS} = -30V V _{DS} = 0	V _{DS} = -30V V _{GS} = 0	-1 max.	I _G = -100μA	V _{DS} = 10V V _{GS} = 0	2.6 6.5			V _{DS} = 10V V _{GS} = 0 f = 1kHz	15	V _{DS} = 10V R _g = 1kΩ I _D = 0.5mA f = 1kHz	3		TOSHIBA
2SK170 (GR, BL)	AF, Low noise	Si N-channel Junction	-40		10		400	125	V _{GS} = -30V V _{DS} = 0	V _{GS} = -30V V _{DS} = 0	-1 max.	I _G = -100μA	V _{DS} = 10V V _{GS} = 0	2.6 12			V _{DS} = 10V V _{GS} = 0 f = 1kHz	22	V _{DS} = 10V R _g = 1kΩ I _D = 1mA f = 1kHz	6		TOSHIBA

DIODES, LEDs

DEVICE TYPE	APPLICATIONS	STRUCTURE†	MAXIMUM RATINGS Absolute-Maximum Values: (TA = 25°C unless otherwise specified)								ELECTRICAL CHARACTERISTICS Typical Values: (TA = 25°C unless otherwise specified)								MANUFACTURER	
			Reverse Surge Voltage V _{RS} (V)	Peak Reverse Voltage V _{RM} (V)	Reverse Voltage V _R (V)	Peak Forward Voltage V _{FM} (V)	Peak Forward Current I _{FM} (mA)	Average Rectified Current I _O (mA)	Forward Surge Current I _{FS} (A)	Junction Temperature T _J (°C)	Total Power Dissipation P _D (mW)	Forward Current I _{FM} (mA)	Forward Voltage V _F (V)	Forward Voltage V _{Fmax} (V)	Reverse Current I _{RM} (mA)	Reverse Current I _{VR} (mA)	Reverse Current I _{VR} (mA)	Test Condition VR (V)	Others	
DS446	Switching	Si-EP		105	100			500	200	0.7	175				0.66	1.5	0.1	100		SANYO
GP10-4002	Rectifier	Si-DJ			100				1A	30	175				1.1	1A	5			GENERAL INSTRUMENT
W02	Rectifier	Si-DJ (Bridge)	200	200		140		1.5A	50	150					1	1A	10			GENERAL INSTRUMENT
LN31G-CPH	Indicator (green)	GeP			4			40			85	90			2.8	20	10	4		MATSUSHITA
GL-5ND5	Indicator (red/green)	Gap/GaAsP (red) (green)						50			85	70 85			2.4 2.8	20	10	4		SHARP
PRG-5114S	Indicator (red/green)	GeP/GaP (red) (green)				100				85	75 125			2.5	10				STANLEY	

ZENER DIODES

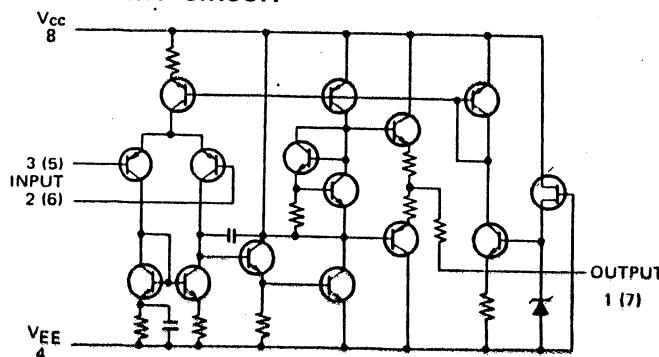
DEVICE TYPE	APPLICATIONS	STRUCTURE†	MAXIMUM RATINGS Absolute-Maximum Values: (TA = 25°C unless otherwise specified)								ELECTRICAL CHARACTERISTICS Typical Values: (TA = 25°C unless otherwise specified)								MANUFACTURER	
			Total Power Dissipation P _D (mW)	Zener Current I _Z (A)	Junction Temperature T _J (°C)	Zener Voltage V _Z			Test Conditions	Differential Resistance r _Z		Temperature Coefficient T _Z			Reverse Current I _Z		Test Conditions			
						MIN (V)	TYP (V)	MAX (V)		I _Z (mA)	TYP (Ω)	MAX (Ω)	I _Z (mA)	TYP (%/°C)	MAX (%/°C)	I _Z (mA)	MAX (μA)	VR (V)		
RD3.9-EB2	Regulator	Si-J	400		175	3.89		4.16	20		50	20					10	1		NEC
RD7.5-EB1	Regulator	Si-J	400		175	6.85		7.22	20		10	20					2	4		NEC
RD9.1-EB2	Regulator	Si-J	400		175	9.87		9.01	20		10	20					2	6		NEC
RD3.9-FB2	Regulator	Si-J	1000		175	3.88		4.15	40		15	40					40	1		NEC

INTEGRATED CIRCUIT NJM2043D

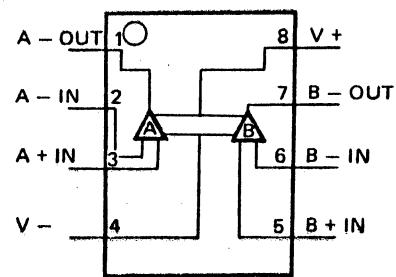
FUNCTION/MANUFACTURER

- Dual Pre-amplifier/JRC

EQUIVALENT CIRCUIT



CONNECTION INFORMATION (TOP VIEW)

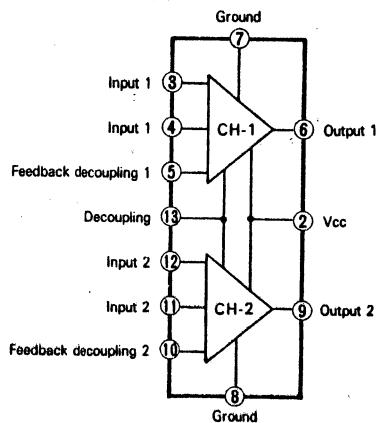


INTEGRATED CIRCUIT LA4170

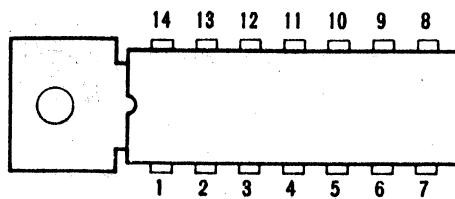
FUNCTION/MANUFACTURER

- Dual Headphone Amplifier/Sanyo

BLOCK DIAGRAM



CONNECTION INFORMATION (TOP VIEW)

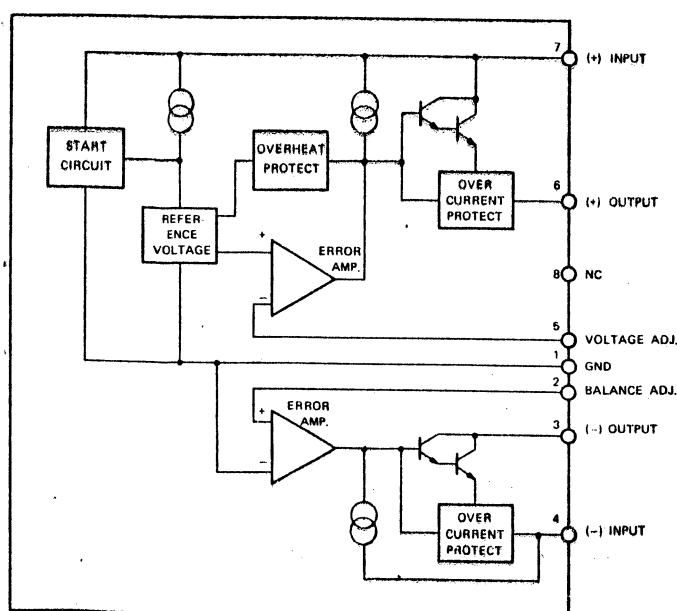


INTEGRATED CIRCUIT M5230L

FUNCTION/MANUFACTURER

- Voltage Regulator/Mitsubishi

BLOCK DIAGRAM



CONNECTION INFORMATION (SIDE VIEW)

